Premature rupture of the membranes - further results with the use of PVP-iodine for prevention of ascending infection and clinical management

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The permanent infusion of highly diluted PVP-iodine solution into the vagina in cases of premature rupture of membranes has been introduced three years ago in German (1) and two years ago in English (2) literature.

Results

For this panel we prepared a new evaluation, concerning the most important clinical success criteria, preferably the infant morbidity and mortality caused by infection (Tab. 1). During the period from January 1977 to December 1980, 161 premature infants (<37/0 weeks of gestation) born after a latency period of more than 18 hours after premature rupture of membranes and vaginal PVP-iodine prophylaxis, no infant died in the whole neonatal period (1st to 28th day of life). The mortality during the period before the application of PVP-iodine lay in the region of 6.5% in our department; related to our present material of 161 cases, this would be 10 or 11 infants.

Comparison of morbidity and mortality of premature infants (< 37/0 pregnancy weeks, birthweight > 1000 g) in the newborn period (1–28 day of life) after early rupture of the membranes (latency: rupture–birth > 18 hours).

Clinical procedure	Period	No.of cases	Morbidity severe infections n	Morbidity severe infections %	Mortality caused by severe infections n	Mortality caused by severe infections %	Mortality caused by other reasons n	Mortality caused by other reasons %	Total mortality n	Total mortality %
No vaginal infection prophylaxis	VI/74 –XII/76	n=77	8	10.4	5	6.5	2	2.6	7	9.1
With vaginal PVP–iodine–infusion Latency:rupture of the membranes-infus.:≤ 4 hours	I/77– XII/80	n=126	5	4.0	0	0	1	0.8	1	0.8
Latency: rupture of the membranes-infus.: > 4 hours		n=35	7	20.0	0	0	2	5.7	2	5.7
All cases with PVP–iodine-infusion		n=161	12	7.5	0	0	3	1.9	3	1.9

Tab. 1

A direct statistical comparison of the two groups cannot be given in full as they were taken from different periods. However the results are nevertheless very informative as, in the previous period before application of PVP-iodine, we tended

Average gestational age, birthweight and the 10th, 50th and 90th percentile for the latency period between rupture of membranes and birth.

	Gestational age	Birthweight	Latency period (hours) 10. percentile	50. percentile	90. percentile
Without PVP–iodine-prophylaxis VI/74 – XII/76	$\bar{x}$=33/3 ± 3/0	$\bar{x}$= 2220±590	23	52	167
PVP–iodine–prophylaxis I/77 – XII/80	$\bar{x}$=33/6 ± 3/0	$\bar{x}$=2250±540	23	65	193

Tab. 2

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to a more active management, which would rather reduce infection morbidity and mortality. The more active management is reflected through the shorter latency period between premature rupture of membranes and the birth (Tab. 2).

When considering infant morbidity caused by infection it is shown (Tab. 1) that this is only less in the group of 126 infants which received the PVP-iodine application within 4 hours after rupture of the membranes out of the total of 161 who received PVP-iodine treatment at all.

In the remaining group of 35 infants where the PVP-iodine application was not started within 4 hours after rupture the morbidity was higher, twice as high as in the period before the use of PVP-iodine, but fortunately none of these infants died from severe infection during the neonatal period. In any case it's recommendable to achieve the shortest possible latency period between rupture of membranes and PVP-iodine application.

Side effects of iodine-resorption

After premature rupture of the membranes and PVP-iodine prophylaxis, the fetus is very probably not directly exposed to the PVP-iodine solution. However vaginal iodine-resorption can occur through the mother, which can lead to an iodine increase in the fetal blood and can interfere with the thyroid function of the newborn.

In order to elucidate whether we are dealing with a harmful and lasting or a transient and tolerable effect, the TSH and thyroid hormone concentrations of these newborn and of all newborn whose mothers received PVP-iodine infection prophylaxis during intensive monitoring throughout the labor - altogether 1045 infants - have been investigated (Tab. 3). This is a cooperative study with the Department of Pediatrics of the Free University of Berlin. We found in 104 cases elevated TSH-values of more than 20 µU/ml, and in 13 cases of more than 50 µU/ml. These newborn have been controlled until normalization. We were reassured to find that the striking alterations of TSH and thyroid hormones did not last longer than 10 days.

Prospective study of newborn treated with PVP–Iodine after premature rupture of membranes and sub partu.
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Period of time	Time of TSH–determination	Number	Elevated TSH–values µU/ml		TSH–control on 10th day
			>20	> 50	
July 1978–April 1979 and Nov. 1980–July 1981	UAB, 3rd or 5th day	1045	104 = 10.0%	13 = 1.2%	normal

UAB = Umbilical artery blood

Tab. 3

As far as such a transient depression of thyroid activity is not taken as an indication for substitutive therapy by pediatric endocrinologists, we can accept the situation when careful control and follow up examinations are guaranteed.

However, these TSH elevations may imitate changes found in congenital hypothyroidism, and thereby cause anxiety in parents and the responsible doctor.

Therefore, close cooperation between the obstetrician using PVP-iodine and the screening laboratory is important, in order to avoid unnecessary diagnostic and therapeutic procedures in these infants on the one hand, and on the other hand not to miss an early treatment of true congenital hypothyroidism.

Due to the possibility of iodine resorption occurring through the mother, all pregnant women should be excluded from this therapy who have had thyroid illness in the past.

If in the future other suitable disinfectant solutions without any negative side-effects could be found, then it could be recommendable to renounce on the use of solutions containing iodine.

At the present time we use the following clinical procedure in cases of early rupture of membranes: a) Using PVP-iodine prophylaxis, if necessary combined with tocolytic therapy (application of betamimetics), we wait when possible until the pregnancy has reached 35 completed weeks. Up to this point the fetus has grown sufficiently not to be particularly endangered as it is close to term. Also the chances are much better for the newborn not to be separated too long from his mother if at all. b) At the very beginning of our management we give - if the gestational age is 26 weeks - lung maturation treatment consisting of four doses of 4 mg Betamethason every 12 hours. c) From the 36th week of gestation onwards we discontinue the tocolytic therapy and wait some hours until spontaneous labor starts. If this is not the case and cervix ripeness is given (Bishop Score $\geqslant 7$, better $\geqslant 8$), we induce labor by oxytocin infusion. We start with 0.5 mU and increase the dose every 5 minutes by 0.5 mU respectively. If cervix ripeness is insufficient we apply PG-Gel (0.4 mg = 40 µg PGE_2) into the cervix and wait until a sufficient ripeness is achieved and then induce labor actively.

References can be obtained from the author:

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